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EXAMINER

BERMAN, SUSAN W

ART UNIT PAPER NUMBER

1711

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/826,059

Applicant(s)

TAKABAYASHI ET AL.

Examiner

Susan W. Berman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 12-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☒ Claim(s) 1-25 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 August 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/05, 10/04</u> | 6) <input type="checkbox"/> Other: ____ |

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-11, drawn to an ink jet ink composition comprising an onium salt and an oxetane compound, classified in class 522, subclass 031.
- II. Claims 12-15, drawn to an image forming method employing the Group I composition, classified in class 427, subclass 466.
- III. Claim 16, drawn to an ink jet recording apparatus to use in the process of Group II, classified in class 374, subclass 001.
- IV. Claims 17-25, drawn to a specific triarylsulfonium salt and composition containing the sulfonium salt and an epoxy compound, classified in class 522, subclass 031.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and IV are directed to related compositions. The related inventions are distinct if the inventions as claimed do not overlap in scope, i.e., are mutually exclusive; the inventions as claimed are not obvious variants; and the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect. See MPEP § 806.05(j). In the instant case: Invention I can contain an iodonium salt or a sulfonium salt while Invention IV requires a specific sulfonium salt. . Invention I contains an oxetane compound while invention IV contains an epoxy compound. Thus the compositions of Invention I and Invention IV do not require the same components and would be expected to have different effects. Invention I is an ink jet ink composition functioning as an ink jet ink while Invention IV is not limited to ink jet ink compositions and functioning as an ink jet ink

Inventions I and II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a

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materially different process of using that product. See MPEP § 806.05(h). In the instant case the composition as claimed can be used in a materially different process such as a process of printing without ejecting droplets from an ink jet recording head and/or a process using thermal curing.

Inventions II and III are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed can be practiced without the requirement to heat the compositions and the ink jet recording head to 35-100°C before ejecting the ink composition.

Inventions I or II or III and IV are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different designs, modes of operation, and effects (MPEP § 802.01 and § 806.06). In the instant case, the different inventions are not claimed as being used together and would be expected to have different effects. The active ray curable composition of Group IV is not required to have the properties of an ink jet ink composition of Group I or to be useful in a method for ink jet printing as in Group II or to be suitable for use in an ink jet recording apparatus in Group III.

Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper. Because these inventions are independent or distinct for the reasons given above and the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper. Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

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During a telephone conversation with Marshall Chick on May 31, 2006, a provisional election was made with traverse to prosecute the invention of Group I, claims 1-11. Affirmation of this election must be made by applicant in replying to this Office action. Claims 12-25 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 4, 5 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 4 is indefinite because the "substituent" groups suitable for R_1 to R_{17} are not defined by name or structure. Claim 10 is indefinite because the "substituent" groups suitable for R_1 to R_6 are not defined by name or structure. Claim 5 does not have antecedent basis in claim 4 because claim 4 excludes phenylthio and phenoxy groups from substituents R_1 to R_3 in formula (1) while Formulas 9, 10, 11, 12 and 13 contain phenylthio or phenoxy groups as substituents.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 4, 8 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 2002-241474 (as disclosed in the translation submitted 12-22-2005). J'474 discloses and claims a sulfonium salt of formula (1) wherein all benzene rings are directly bonded to carbon in substituents to improve solubility and provide an onium salt wherein no benzene is produced from the initiator (page 1 and page 5). The disclosed cationically polymerizable compositions can comprise a compound containing an oxetane ring (page 8). Species of formula (1) disclosed by J '474 correspond to species of formula (1) in instant claim 4.

Claims 1, 2, 4, 8 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakayashiki et al in PrePublication US 2006/0055088, filed 09-25-2003. Nakayashiki et al disclose an aromatic sulfonium salt of formula (1) set forth in the Abstract that can be used as an ink for food packaging because the release of benzene is suppressed. See [0017] to [0020] and [0215] for the definition of the sulfonium salt. Compositions comprising oxetane compounds, epoxy compounds and vinyl ether compounds are taught in [0057], [0064], [0067] and in Table 3. Photocurable inks are taught in Examples 16-21.

Claims 1, 2, 4, 8 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Crivello [US 2005/0064333, having an effective filing date of May 16,2002]. Crivello discloses a thianthrenium salt

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cationic photoinitiator and teaches that the disclosed photoinitiators do not generate benzene on exposure to UV radiation. Compositions comprising epoxides, oxetanes and/or vinyl ethers are taught [0021]. The compositions are said to be useful as printing inks, however, ink jet inks are not specifically mentioned.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2 and 4-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over J 2002-188025 (Abstract) in view of JP 2002-241474 (as disclosed in the translation submitted 12-22-2005). J '025 discloses low viscosity ink jet ink compositions comprising a cationic photoinitiator and oxetane, epoxy and vinyl ether compounds in weight percents overlapping those set forth in instant claim 9. The disclosure of J '474 is discussed above.

It would have been obvious to one skilled in the art at the time of the invention to employ the sulfonium salt cationic initiator taught by J '474 as the cationic photoinitiator in the ink jet ink compositions disclosed by J '025. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of taking advantage of the teaching that the sulfonium salts taught by J '474 have improved solubility and do not produce benzene when activated. With respect to claim 5, the compound of formula (7) is a species of the sulfonium salt compound disclosed by J '474 wherein all substituents are an alkyl group. With respect to claims 6 and 7, J '474 teaches suitable additives on page 10, second paragraph; thus, it would have been obvious to one skilled in the art at the time of the invention to add one or both of the additives set forth in instant claims 6 and 7. With respect to

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claim 9, It would have been obvious to one skilled in the art at the time of the invention to employ a mixture of such compounds and to determine the required weight % of each to provide the desired properties, such as viscosity, because J '025 teaches ink jet inks comprising a mixture of oxetane, epoxy and vinyl ether compounds in weight percents overlapping those set forth in claim 9. With respect to claim 11, It would have been obvious to one skilled in the art at the time of the invention to adjust the weight percents of components in the compositions taught by J '025 to provide the recited viscosity because J '025 teaches that the disclosed compositions are useful as ink jet ink compositions having low viscosity.

Claims 1, 2 and 4-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over J 2002-188025 (Abstract) in view of Nakayashiki et al. J '025 discloses low viscosity ink jet ink compositions comprising a cationic photoinitiator and oxetane, epoxy and vinyl ether compounds in weight percents overlapping those set forth in instant claim 9. The disclosure of Nakayashiki et al is discussed above.

It would have been obvious to one skilled in the art at the time of the invention to employ the sulfonium salt cationic initiator taught by Nakayashiki et al as the cationic photoinitiator in the ink jet ink compositions disclosed by J '025. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of taking advantage of the teaching that the sulfonium salts taught by Nakayashiki et al can be used as an ink for food packaging because the release of benzene is suppressed. With respect to claims 6 and 7, Nakayashiki et al teach suitable additives in paragraph [0072]; thus, it would have been obvious to one skilled in the art at the time of the invention to add one or both of the additives set forth in instant claims 6 and 7. With respect to claim 9, It would have been obvious to one skilled in the art at the time of the invention to employ a mixture of such compounds and to determine the required weight % of each to provide the desired properties, such as viscosity, because J '025 teaches ink jet inks comprising a mixture of oxetane, epoxy and vinyl ether compounds in weight percents

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overlapping those set forth in claim 9. With respect to claim 11, It would have been obvious to one skilled in the art at the time of the invention to adjust the weight percents of components in the compositions taught by J '025 to provide the recited viscosity because J '025 teaches that the disclosed compositions are useful as ink jet ink compositions having low viscosity.

Claims 1, 2 and 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over J 2002-188025 (Abstract) in view of Crivello [US 2005/0064333, having an effective filing date of May 16,2002]. J '025 discloses low viscosity ink jet ink compositions comprising a cationic photoinitiator and oxetane, epoxy and vinyl ether compounds in weight percents overlapping those set forth in instant claim 9. The disclosure of Crivello is discussed above.

It would have been obvious to one skilled in the art at the time of the invention to employ the thianthrenium sulfonium salt cationic initiator taught by Crivello as the cationic photoinitiator in compositions comprising epoxy, oxetane and/or vinyl ether compounds in the analogous ink jet ink compositions disclosed by J '025. One of ordinary skill in the art at the time of the invention would have been motivated by a reasonable expectation of taking advantage of the teaching that the sulfonium salts taught by Crivello do not generate benzene on exposure to UV radiation. With respect to claims 6 and 7, Crivello teaches suitable additives in paragraph [0024]; thus, it would have been obvious to one skilled in the art at the time of the invention to add one or both of the additives set forth in instant claims 6 and 7. With respect to claim 9, It would have been obvious to one skilled in the art at the time of the invention to employ a mixture of such compounds and to determine the required weight % of each to provide the desired properties, such as viscosity, because J '025 teaches ink jet inks comprising a mixture of oxetane, epoxy and vinyl ether compounds in weight percents overlapping those set forth in claim 9. With respect to claim 11, It would have been obvious to one skilled in the art at the time of the invention to adjust the weight percents of components in the compositions taught by J '025 to provide the recited viscosity

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because J '025 teaches that the disclosed compositions are useful as ink jet ink compositions having low viscosity.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over J '025 in view of each of J '474, as applied to claim 1 above, and further in view of Schulz et al (6,306,555). J '025 discloses low viscosity ink jet ink compositions comprising a cationic photoinitiator and oxetane, epoxy and vinyl ether compounds in weight percents overlapping those set forth in instant claim 9. J'474 discloses and claims a sulfonium salt of formula (1) wherein all benzene rings are directly bonded to carbon in substituents to improve solubility and provide an onium salt wherein no benzene is produced from the initiator (page 1 and page 5). Schulz et al teach radiation sensitive compositions comprising cationically or acid-catalytically polymerizable compounds and a diaryliodonium salt. The disclosed diaryliodonium salt of formula (I) is substituted on both phenyl groups with alkyl or cycloalkyl groups.

It would have been obvious to one skilled in the art at the time of the invention to substitute the iodonium salt disclosed by Schulz et al for the sulfonium salt in the compositions taught by J '025 in combination with J '474 for the following reasons. J '025 discloses that cationic photoinitiators are suitable in the disclosed compositions. J '474 teaches that the disclosed sulfonium salt does not release benzene when irradiated because all benzene rings are directly bonded to carbon in substituents on the rings. Schulz et al teach an iodonium salt wherein all benzene rings are directly bonded to carbon in substituents on the rings, therefore, the iodonium salts disclosed by Schulz et al would have been expected to also have the property of not releasing benzene upon exposure to radiation. Thus One of ordinary skill in the art at the time of the invention would have been motivated to employ the iodonium salt by an expectation of taking advantage of the property of not releasing benzene during the photopolymerization process.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan W. Berman whose telephone number is 571 272 1067. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571 272 1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SB
6/9/06



Susan W Berman
Primary Examiner
Art Unit 1711